

DaimlerChrysler AG  
Stuttgart

FTP/P-Ng  
15.11.00

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New patent claims

1. Brake unit (10), which has at least two brake shoes (20a, 20b), each with a friction lining (21a, 21b), and at least one brake disc rotor (11), the outer surfaces of the brake disc rotor (11) each having at least partially a friction surface (12a, 12b) composed of a metal/ceramic composite material (CMC) for respective friction linings (21a, 21b), and at least one application device (30), which acts upon the brake shoes (20a, 20b) during the braking operation, characterized in that at least two application devices (30) are provided, which act upon at least two brake shoes (20a, 20b), at least two pistons (31, 32) being provided per brake shoe (20a, 20b), in that brake shoes are provided with individual friction linings, each with associated individual application devices, and in that the friction linings (21a, 21b) of the brake shoes (20a, 20b) cover at least 15% of the friction surface (12a, 12b) of the brake disc rotor (11), the at least two application devices (30) being designed in such a way that the pressure acting on the brake shoes (20a, 20b) acts essentially uniformly on the friction surface (12a, 12b) during the braking operation.
2. Brake unit according to Claim 1, characterized in that the ratio of the mean height (h) to the mean width (b) of each friction lining (21a, 21b) of a brake shoe (20a, 20b) is approximately 1:1 to 1:1.6.
3. Brake unit according to one of the preceding claims, characterized in that a plurality of application devices is provided, which act on at least four brake

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shoes, at least two pistons (31, 32) being provided per brake shoe.

4. Brake unit according to one of the preceding claims, characterized in that single- or multiple-piston  
5 callipers, in which one or more, preferably two to six, particularly preferably four or six brake shoes are arranged, are provided for each application device.

5. Brake unit according to one of the preceding claims, characterized in that the at least two  
10 application devices (30) have mechanical and/or electronic compensation elements, which are designed in such a way that the application forces are distributed uniformly to a plurality of friction linings (21a, 21b) using the principle of balanced levers.

15 6. Brake unit according to one of the preceding claims, characterized in that the at least two pistons (31, 32) are arranged in such a way that the pressure acting on the brake shoes (20a, 20b) is as uniform as possible, in particular for operating friction  
20 coefficients of about 0.40 to 0.45.

7. Brake unit according to one of the preceding claims, characterized in that two brake shoes per friction surface (12a, 12b) of the brake disc rotor (11) are arranged in such a way that their lines of action  
25 enclose an angle  $\alpha$  of about 110 to 130°.

8. Brake unit according to one of the preceding claims, characterized in that the friction linings (21a, 21b) have a compressibility of over 1  $\mu\text{m}/\text{bar}$  brake fluid pressure.

30 9. Brake unit according to one of the preceding claims, characterized in that an intermediate layer, the compressibility of which is over 1  $\mu\text{m}/\text{bar}$  brake fluid pressure, is provided between the friction linings (21a, 21b) of the brake shoes (20a, 20b) of the application

device (30).

10. Brake unit according to one of the preceding claims, characterized in that at least the friction surfaces (12a, 12b) of the brake disc rotor (11) are  
5 formed by an aluminium/ceramic composite material or a silicon/ceramic composite material.

11. Brake unit according to one of the preceding claims, characterized in that at least the friction surfaces (12a, 12b) of the brake disc rotor (11) are  
10 formed by a fibre-reinforced composite material.

12. Brake unit according to Claim 11, characterized in that the composite material contains carbon fibres and/or silicon carbide fibres as reinforcing fibres.

13. Brake unit according to either of Claims 11 and  
15 12, characterized in that the composite material contains long fibres, preferably in the form of woven fibre structures or nonwoven fibre structures, as reinforcing fibres.

14. Brake unit according to either of Claims 11 and  
20 12, characterized in that the composite material contains short fibres, preferably isotropically oriented short fibres, as reinforcing fibres.

15. Brake unit according to one of the preceding claims, characterized in that the composite material  
25 contains a silicon carbide ceramic or an aluminium oxide ceramic as the ceramic component.

16. Brake unit according to one of the preceding claims, characterized in that the friction surface (12a, 12b) of the brake disc rotor (11) and the brake disc  
30 rotor (11) are formed in one piece and are composed of the same material.

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